

**Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on  
Mallard Duck (*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 473723-46

<b>Data Requirement:</b>	PMRA Data Code {.....}
	EPA DP Barcode 353315
	OECD Data Point {.....}
	EPA MRID 473723-46
	EPA Guideline OPPTS 850.2300

**Test material:** AE C656948                                   **Purity:** 94.7%  
**Common name:** Fluopyram  
**Chemical name:**  
IUPAC: N-{2-[3-chloro-5-(trifluoromethyl)-2-pyridyl]ethyl}-α,α,α-trifluoro-o-toluamide  
CAS: N-[2-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]ethyl]-2-(trifluoromethyl)benzamide  
CAS No.: 658066-35-4  
Synonyms: None reported

**Reference/Submission No.:** { .....

<b>Company Code</b>	{.....}	[For PMRA]
<b>Active Code</b>	{.....}	[For PMRA]
<b>Use Site Category</b>	{.....}	[For PMRA]
<b>EPA PC Code</b>	080302	

**CITATION:** Christ, M.T., and C.V. Lam. 2008. Effect of AE C656948 Technical on Reproduction to the Mallard Duck (*Anas platyrhynchos*). Unpublished study performed by Bayer CropScience, Stilwell, KS. Laboratory Project No. EBGMP041. Study sponsored by Bayer CropScience, Research Triangle Park, NC. Study initiated May 8, 2007 and submitted March 26, 2008.

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## **EXECUTIVE SUMMARY**

The one-generation reproductive toxicity of AE C656948 (fluopyram) to 15 pairs per level of 16-week old mallard duck (*Anas platyrhynchos*) was assessed over *ca.* 19 weeks. AE C656948 was administered to the birds in the diet at nominal concentrations of 0 (control), 100, 200, or 500 mg ai/kg diet (adjusted for purity). Mean-measured concentrations were <9.61 (<LOQ, control), 100, 183, and 428 mg ai/kg diet, respectively.

There were no treatment-related effects observed upon any adult or reproductive parameter at any concentration level. However, a slight (4% of control) but significant effect ( $p=0.044$ ) was observed on 14-day survivor weights at the highest treatment level. As a result, the NOAEC for this study is determined to be 183 mg ai/kg diet.

This study is **scientifically sound/unsound** and **{does or does not}** satisfy the guideline requirement for a mallard duck (*Anas platyrhynchos*) reproductive toxicity study.

## **Results Synopsis**

Test Organism Size/Age (mean Weight): 16-weeks old; 822-1333 g (combined sexes)

NOAEC: 183 mg ai/kg diet

LOAEC: 428 mg ai/kg diet

Endpoint(s) Affected: 14-day survivor weight

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**I. REPORTED MATERIALS AND METHODS**

**GUIDELINE FOLLOWED:**

U.S. EPA Pesticide Assessment Guidelines, Series 71-4 (1982)  
OECD Guideline for Testing of Chemicals, No. 206 (1984)  
U.S. EPA Ecological Effects Test Guidelines, OPPTS 850.2300 (1996)

**COMPLIANCE:**

Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. This study was conducted in compliance with the U.S. EPA 40 CFR Parts 160 with the following exception: basal diet screening analysis.

**A. REPORTED MATERIALS:**

**1. Test Material**

**Table 1: Test material.**

Parameter	Details
Name	AE C656948 (fluopyram)
Description	Solid
Lot No./Batch No.	08528/0002
Purity	94.7%
Stability under test conditions	Verified in treated feed under frozen storage for 46 weeks and ambient storage for 9 days.
Storage conditions	Ambient

**Table 2: Physicochemical properties of fluopyram.**

Parameter	Values
Water solubility at 20°C	Not reported
Vapor pressure	Not reported
UV absorption	Not reported
pKa	Not reported
Kow	Not reported

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**2. Test organism:**

**Table 3: Test organism.**

Parameter	Details
Species (common and scientific names):	Mallard duck ( <i>Anas platyrhynchos</i> )
Age at Study Initiation:	16 weeks old
Body Weight: (mean and range)	Males: Overall range (n=60) of 995 to 1333 g, with group means of 1113 to 1143 g.  Females: Overall range (n=60) of 822 to 1089 g, with group means of 956 to 963 g.
Source:	Flying Mallards, Hartville, MO

**B. REPORTED STUDY DESIGN:**

**1. Experimental Conditions**

- a. Range-finding study: None.
- b. Definitive Study:

**Table 4: Experimental Parameters.**

Parameter	Details
Acclimation period:	2 weeks
Conditions (same as test or not):	Same as test
Feeding:	Teklad Starter Ration during acclimation and Teklad Game Bird Ration during testing, <i>ad libitum</i> Tap water, <i>ad libitum</i> .
Health (any mortality observed):	Not reported

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<b>Parameter</b>	<b>Details</b>
<u>Test duration</u> pre-laying exposure: egg-laying exposure: withdrawal period, if used:	<i>Ca.</i> 10 weeks 9 weeks None
<u>Pen (for parental and offspring)</u> size:  construction materials:  number:	Parental: 79 (L) x 61 (W) x 53 (H) cm Offspring: 91 (L) x 76 (W) x 25 (H) cm  Parental: stainless steel wire grid and sheeting Offspring: galvanized wire mesh and sheeting  15 parental pens/treatment level. Hatchlings were group-housed according to the appropriate parental concentration.
Number of birds per pen (male:female)	2 birds/pen (1 male:1 female)
<u>Number of pens per group/treatment</u> negative control: solvent control: treated:	15 pens N/A 15 pens/treatment
<u>Test concentrations (mg ai/kg diet)</u> nominal:  measured:	0 (negative control), 100, 200, and 500 mg ai/kg diet <9.61 (<LOQ, control), 100, 183, and 428 mg ai/kg diet, respectively
Maximum labeled field residue anticipated and source of information:	Not specified
Solvent/vehicle, if used type: amount:	N/A
Was detailed description and nutrient analysis of the basal diet provided? (Yes/No)	Yes

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<b>Parameter</b>	<b>Details</b>
Preparation of test diet	The study authors reported that at weekly intervals, the appropriate amount of sieved AE C656948 was blended with a portion of basal diet in a Kitchen Aid mixer. This “premix” was then combined with the remaining quantity of basal diet and mechanically mixed using a Hobart Mixer. If not used immediately after mixing, diets were stored in covered plastic containers at -12°C.
Indicate whether stability and homogeneity of test material in diet determined (Yes/No)	Yes
Were concentrations in diet verified by chemical analysis?	Yes
Did chemical analysis confirm that diet was stable? and homogeneous?	Yes Yes
Feeding and husbandry	Feeding and husbandry conditions appeared to be adequate, given guideline recommendations.
<u>Test conditions</u> temperature: relative humidity: photoperiod:  light intensity: air exchanges:	Mean of 20.9 °C Mean of 58.6% 7 hr light/day up through Week 8; 17 hr light/day thereafter 4.6 to 14.0 ft. candles 11.7 volumes per hour
<b>Egg Collection and Incubation</b>	
<u>Egg collection and storage</u> collection interval: storage temperature: storage humidity:	Twice daily Mean of 11.3°C Mean of 95.8%
Were eggs candled for cracks prior to setting for incubation?	Yes
Were eggs set weekly?	Yes
When candling was done for fertility?	Day 14 (embryo viability) Day 21 (embryo survival)
When the eggs were transferred to the hatcher?	Day 23

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Parameter	Details
<u>Hatching conditions</u> temperature: humidity: photoperiod:	Mean of 37.2°C Mean of 69.6% 14 hours light/10 hours dark (hatchlings)
Day the hatched eggs were removed and counted	Days 27 and 28
Were egg shells washed and dried for at least 48 hrs before measuring?	Yes
<u>Egg shell thickness</u> no. of eggs used: intervals: mode of measurement:	All eggs laid One day every other week throughout the egg laying period Three points around the equatorial circumference to the nearest 0.001 mm
Reference chemical, if used	None used

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**2. Observations:**

**Table 5: Observations.**

Parameter	Details
<b>Parameters measured</b>	
<u>Parental</u>	<ul style="list-style-type: none"><li>- mortality</li><li>- body weight</li><li>- food consumption</li><li>- signs of toxicity</li><li>- necropsy</li></ul>
<u>Egg collection and subsequent development</u>	<ul style="list-style-type: none"><li>- eggs laid</li><li>- eggs cracked</li><li>- egg shell thickness</li><li>- egg shell strength</li><li>- eggs set</li><li>- viable embryos</li><li>- live 18-day embryos</li><li>- number of hatchlings</li><li>- hatching body weight</li><li>- number of 14-day-old survivors</li><li>- 14-day-old survivor body weight</li><li>- signs of toxicity of hatchlings</li></ul>
Indicate if the test material was regurgitated	No indications of dietary regurgitation.
Observation intervals (for various parameters)	Parental mortality and signs of toxicity: daily Parental body weights: Weeks 1, 3, 5, 7, 9, and 19 Parental food consumption: weekly  Offspring mortality and signs of toxicity: daily Offspring body weights: 0 and 14 days
Were raw data included?	Yes

**II. REPORTED RESULTS:**

**A. REPORTED MORTALITY:**

No mortality occurred during the study at any test level.

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**Table 6: Effect of AE C656948 (Fluopyram) on Mortality of Mallard Duck.**

Treatment (mg ai/kg diet) Mean-measured (and Nominal) Concentrations	Observation Period					
	Week 6		Week 12		Week 19	
	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female	No. Dead Male	No. Dead Female
Control	0	0	0	0	0	0
100 (100)	0	0	0	0	0	0
183 (200)	0	0	0	0	0	0
428 (500)	0	0	0	0	0	0

**B. REPORTED REPRODUCTIVE AND OTHER ENDPOINTS:**

**Abnormal Effects/Behavior:** No treatment-related clinical signs of toxicity were observed at any treatment level. The study authors reported that minor occurrences of feather loss and minor injuries “were observed in the control and several treatment levels”; these observations were associated with normal laboratory cage wear.

**Food Consumption:** No statistically-significant differences were observed at any treatment level for feed consumption, which averaged 103.7, 104.9, 109.2, and 101.6 g/bird/day for the control, 100, 200, and 500 mg ai/kg diet levels, respectively

**Body Weight:** No statistically-significant differences were observed at any treatment level compared to the control regarding male and female adult body weight change from study initiation to termination.

**Necropsy:** All birds from the control and 500 mg ai/kg diet levels, and five birds per sex from the 100 and 200 mg ai/kg diet levels were necropsied at study termination. There were no indications of any treatment-related lesions or other findings. Several birds had feather loss that was associated with normal cage wear.

**Reproductive Effects:** The study authors reported that there were no statistically-significant differences observed from the control for any reproductive endpoint at any treatment level.

The study authors reported that no abnormal symptoms were observed in hatchlings, and that the minor mortality observed in hatchlings occurred at all levels and was considered normal.

**Table 7: Reproductive and Other Parameters (nominal concentrations; study author-reported).**

Parameter	Control	100 mg/kg	200 mg/kg	500 mg/kg	NOAEC/ LOAEC
Eggs laid/hen	52.0	54.0	51.1	49.7	500 mg/kg >500 mg/kg
Eggs cracked/hen	0.07	0.07	0.33	0.13	500 mg/kg >500 mg/kg

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Parameter	Control	100 mg/kg	200 mg/kg	500 mg/kg	NOAEC/ LOAEC
Eggs not cracked/eggs laid (%)	100	100	99	100	500 mg/kg >500 mg/kg
Eggs set/hen	47.3	49.1	45.8	45.1	500 mg/kg >500 mg/kg
Eggs set/eggs laid (%)	90	91	90	91	500 mg/kg >500 mg/kg
Shell thickness (mm ± SD)	0.330 ± 0.019	0.331 ± 0.020	0.329 ± 0.017	0.327 ± 0.015	500 mg/kg >500 mg/kg
Shell strength (Kg ± SD)	2.682 ± 0.310	2.640 ± 0.245	2.676 ± 0.323	2.717 ± 0.191	500 mg/kg >500 mg/kg
Viable embryos/hen	32.2	34.7	41.1	38.8	500 mg/kg >500 mg/kg
Viable embryos/eggs set (%)	68	72	89	86	500 mg/kg >500 mg/kg
Live 3-week embryos/hen	32.1	34.1	40.7	38.7	500 mg/kg >500 mg/kg
Live 3-week embryos/viable embryos (%)	100	98	98	100	500 mg/kg >500 mg/kg
No. of hatchlings/hen	27.9	27.9	28.3	30.0	500 mg/kg >500 mg/kg
No. of hatchlings/live 3-week embryos (%)	82	83	68	77	500 mg/kg >500 mg/kg
Hatching weight (g ± SD)	36.0 ± 2.1	36.9 ± 2.5	36.5 ± 1.8	35.2 ± 2.4	500 mg/kg >500 mg/kg
14-day old survivors/hen	27.7	27.9	28.0	30.0	500 mg/kg >500 mg/kg
14-day old survivors weight (g ± SD)	254.7 ± 10.8	257.9 ± 15.4	254.0 ± 13.9	245.6 ± 9.9	500 mg/kg >500 mg/kg
14-day old survivors/hatchlings (%)	99	100	99	100	500 mg/kg >500 mg/kg
Mean food consumption (g/bird/day)	103.7	104.9	109.2	101.6	500 mg/kg >500 mg/kg

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Parameter	Control	100 mg/kg	200 mg/kg	500 mg/kg	NOAEC/ LOAEC
Weight (g) of parent females at test initiation: at onset of egg laying: at test termination:	963 1024 1201	959 1005 1211	956 995 1250	958 956 1200	500 mg/kg >500 mg/kg
Weight (g) of parent males at test initiation: at onset of egg laying: at test termination:	1132 1126 1115	1136 1133 1122	1113 1097 1083	1143 1132 1103	500 mg/kg >500 mg/kg
Gross pathology	No treatment-related lesions observed.				500 mg/kg >500 mg/kg

## C. REPORTED STATISTICS:

The following parameters were statistically analyzed:

- Adult body weight change for males and females (difference of Weeks 1 and 20)
- Mean adult feed consumption (Weeks 1 through 20)
- No. of (per hen) eggs laid, eggs cracked, and eggs set
- Percentages of eggs not cracked/eggs laid and eggs set/eggs laid
- Egg shell strength and thickness
- No. of (per hen) viable embryos and live 3-week embryos
- Percentages of viable embryos/eggs set and live 3-week embryos/viable embryos
- No. of (per hen) hatchlings and 14-day survivors
- Percentages of hatchlings/eggs set, hatchlings/eggs laid, hatchlings/live 3-week embryos, 14-day survivors/eggs set, 14-day survivors/hatchlings
- Mean hatchling and 14-day survivor body weights

Data were assessed for normality and homogeneity of variances using the Shapiro-Wilk's and Levene's tests, respectively. If the data passed these assumptions, treatment groups were compared to the control group using an analysis of variance (ANOVA) followed by Dunnett's or William's tests. If variances were unequal, then the non-parametric analyses were conducted using the Jonckheere or Mann-Whitney procedures.

Analyses were conducted using ToxStat® statistical software (Version 3.4) at a 95% confidence level. Results were provided generally in terms of nominal concentrations.

## III. REVIEWER'S EVALUATION:

### A. DEVIATIONS FROM GUIDELINES

1. The initial age of the test birds (16 weeks) was younger than recommended (at least 30 weeks old).
2. Pre-test health (including mortality) of the adult birds was not reported.
3. Cage size was significantly smaller than recommended. OPPTS recommends at least 10,000 cm<sup>2</sup> per bird. In this study, the floor space was only 2409.5 cm<sup>2</sup> per bird. Cage sizes smaller than recommended should be shown to not adversely affect the health or reproduction of the ducks.

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4. Mean egg shell thickness for controls (0.330 mm) did not meet the minimum validity requirement of 0.34 mm for mallards.

## B. OTHER STUDY DEFICIENCIES

None

## C. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Analysis was conducted using “chicks.sas” (Ver. 3; March 2002), a SAS program provided by EFED/OPP/USEPA. Data for all endpoints were examined graphically using box plots to determine if they exhibited a dose-dependent response, which was ultimately used to select the multiple comparison test to detect LOAEC and NOAEC. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk’s and Levene’s tests, respectively. Data that satisfied these assumptions were subjected to Dunnett’s and William’s tests and data that did not satisfy these assumptions were subjected to the non-parametric MannWhitney-U (with a Bonferroni adjustment) and Jonckheere’s tests. Data for dead birds were excluded from the analyses. See Appendix I for output of reviewer’s statistical verification and graphs for affected endpoints to support any reviewer-generated conclusions that may differ from those reported in the study.

NOAEC: 183 mg ai/kg

LOAEC: 428 mg ai/kg

Most Sensitive Endpoint(s): 14-day survivor weights

**Table 8: Reproductive and Other Parameters (mean-measured concentrations; reviewer-reported).**

Parameter	Control	100 mg ai/kg	183 mg ai/kg	428 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	52.0	54.0	51.1	49.7	428 mg ai/kg >428 mg ai/kg
Eggs cracked/pen	0.07	0.07	0.33	0.13	428 mg ai/kg >428 mg ai/kg
Eggs not cracked/eggs laid (%)	99.8	99.9	99.4	99.7	428 mg ai/kg >428 mg ai/kg
Eggs set/pen	47.3	49.1	45.8	45.1	428 mg ai/kg >428 mg ai/kg
Shell thickness	0.33	0.33	0.33	0.33	428 mg ai/kg >428 mg ai/kg
Eggs set/eggs laid (%)	90.4	90.9	89.8	90.6	428 mg ai/kg >428 mg ai/kg
Viable embryos/pen	32.2	34.7	41.1	38.8	428 mg ai/kg >428 mg ai/kg
Viable embryos/eggs set (%)	68.3	71.9	88.8	85.9	428 mg ai/kg >428 mg ai/kg

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Live embryos/pen	32.1	34.1	40.7	38.7	428 mg ai/kg >428 mg ai/kg
Live embryos/viable embryos (%)	99.5	98.4	98.5	99.7	428 mg ai/kg >428 mg ai/kg
No. of hatchlings/pen	27.9	27.9	28.3	30.0	428 mg ai/kg >428 mg ai/kg
No. of hatchlings/eggs laid (%)	52.1	51.3	53.1	59.7	428 mg ai/kg >428 mg ai/kg
No. of hatchlings/eggs set (%)	57.7	56.3	59.1	65.5	428 mg ai/kg >428 mg ai/kg
No. of hatchlings/live embryos (%)	82.1	83.4	67.7	77.1	428 mg ai/kg >428 mg ai/kg
Hatching survival/pen	27.7	27.9	28.0	30.0	428 mg ai/kg >428 mg ai/kg
Hatching survival/eggs set (%)	57.4	56.2	58.6	65.5	428 mg ai/kg >428 mg ai/kg
Hatching survival/no. of hatchlings (%)	99.5	99.7	99.1	100	428 mg ai/kg >428 mg ai/kg
Hatching weight (g)	36.0	36.9	36.5	35.2	428 mg ai/kg >428 mg ai/kg
Survivor weight (g)	254.7	257.9	254.0	245.6*	<b>183 mg ai/kg 428 mg ai/kg</b>
Mean food consumption (g/bird/day)	103.6	104.9	102.5	101.7	428 mg ai/kg >428 mg ai/kg
Male weight gain (g)	-17.5	-14.7	-29.6	-39.6	428 mg ai/kg >428 mg ai/kg
Female weight gain (g)	239.0	251.7	293.7	242.7	428 mg ai/kg >428 mg ai/kg

\* Statistically different from the control at p<0.05.

**D. ADDITIONAL REVIEWER COMMENTS:**

With the exception of survivor weight, results of the reviewer's statistical verification were identical to the study authors'. The reviewer's analysis detected a slight (4%), but statistically significant ( $p=0.044$ ) reduction in 14-day survivor weights at the highest treatment level, compared to the average control weight. While the magnitude of the reduction was small, the median values followed linear pattern of decreasing weights with increasing concentrations.

The reviewer could not dismiss this effect as unrelated to treatment because offspring weights were highly affected by fluopyram for the bobwhite quail species. As a result, the reviewer determined the study NOAEC to be 183 mg ai/kg. Mean-measured concentrations are reported in the Executive Summary and Conclusions sections of the DER.

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All OPPTS 850.2300 validity requirements were not fulfilled: the egg shell thickness only averaged 0.330 mm for controls, whereas a 0.34-mm thickness is required. All other validity requirements were met. Specifically, controls produced an average of 27.7, 14-day old survivors per hen during the 9-week production phase (minimum of 10 ducklings per pen during a 10-week production phase) and control mortality was 0% during the study (no more than 10% acceptable in controls).

The study authors reported that birds were within 1 week of age, approaching their first breeding season, and had not been previously used in testing. Upon receipt, five birds per sex were necropsied to verify health, and a sub-sample of birds was swabbed for microbial examination. Swab samples were sent to the University of Missouri Veterinary Medical Diagnostic Laboratory (Columbia, MO). It was reported that no remarkable findings were observed either at necropsy or upon microbiological examination. All birds were examined daily during acclimation, and birds that exhibited abnormal behavior or injuries were excluded from the study. During acclimation, birds received 7 hours of light/day.

In response to the smaller-than-recommended size of the adult cages (as delineated in OPPTS guidance), the study authors reported that the cage size presently used by the laboratory (79 cm x 61 cm floor area) was deemed successful for mallard husbandry and reproduction. This conclusion was based upon “success achieving the reproductive endpoints and fulfilling the validity criteria.” Furthermore, it was reported that if “adults can be maintained without excessive mortality and a good rate of reproductive performance, then variation in housing should be acceptable.”

In response to the younger-than-recommended age of the adult birds (as delineated in OPPTS guidance), the study authors reported that birds at least 16 weeks of age have been routinely used by a number of laboratories with good success. As guidance also mandates that birds should not have been through a previous reproductive cycle, and that egg production should not begin until after 10 weeks of exposure, the study authors maintain that the best possible way to achieve these criteria are to use young adult birds.

The basal ration contained at least 27% protein and 4% fat, and no more than 5% fiber. Offspring were fed Teklad Bayer Starter Ration without the addition of test substance.

Nominal concentrations were adjusted for the purity of the test substance. Concentration verification was performed on samples collected during Weeks 1, 5, 10, 15, and 19. Samples were stored frozen prior to analysis.

Stability was assessed in treated feed prepared at the 100 and 500 mg ai/kg diet treatment levels after 46 weeks of frozen storage or after 9 days of ambient storage. After 46 weeks of frozen storage, recoveries were 93 and 104% of initial values for the 100 and 500 mg ai/kg diet levels, respectively. After 9 days of ambient storage, recoveries were 82 and 92% of nominal values (initial measurements were not determined) for the 100 and 500 mg ai/kg diet levels, respectively. Fresh diets were offered weekly during the definitive study.

Homogeneity was assessed in treated feed prepared at the 100 and 500 mg ai/kg diet levels following the initial mixing procedure. Nine samples per level were collected: three from the top, three from the middle, and three for the bottom of the batch. Calculated coefficients of variations (CV=RSD) were 8 and 9% for the 100 and 500 mg ai/kg diet levels, respectively.

Treated feed samples were extracted by sonicating with acetonitrile for 20 minutes. An aliquot of the extract was filtered (0.45 µm) and diluted with acetonitrile (as needed) prior to analysis using HPLC with UV detection (220 nm). The LOQ for the procedure was 9.61 mg ai/kg diet. Untreated feed was fortified at 240 mg ai/kg diet and analyzed concurrently with the test samples. The mean recovery was 105% (range of 85 to 113%). It was not reported if sample results were corrected for mean procedural recoveries.

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AE C656948 at 9.61, 96.1, 480, or 961 mg ai/kg diet, extracted, and analyzed as described above for the definitive-study samples. The average recovery was 98% (range of 83 to 109%).

To prevent pathogen contamination, eggs were first washed in a Kuhl Egg Washer with warm water and a chlorine-based detergent, and then dipped into a solution of germicidal soap and warm water prior to cold storage.

For the first 4 days in the brooders, hatching water was supplemented with Durvet brand water-soluble vitamin supplement (1 g/gal).

The study authors' calculated daily dietary dosages were 10, 18, and 40 mg ai/kg bw/day for the 100, 200, and 500 mg ai/kg diet levels, respectively.

The experimental dates were May 8 to October 30, 2007.

### **E. CONCLUSIONS:**

This study is scientifically sound/unsound and is thus acceptable or unacceptable. Dietary exposure to AE C656948 (fluopyram) at up to 428 mg ai/kg diet produced no treatment-related effects upon any adult or reproductive parameter. However, a slight (4% reduction from control), but significant effect ( $p=0.044$ ) on 14-day survivor weights may have been treatment-related.

NOAEC: 183 mg ai/kg diet

LOAEC: 428 mg ai/kg diet

Endpoint(s) Affected: 14-day survivor weights

### **IV. REFERENCES:**

Organization for Economic Cooperation and Development. 1984. Avian Reproduction Test. OECD Guidelines for the Testing of Chemicals No. 206.

U.S. Environmental Protection Agency. 1996. Ecological Effects Test Guidelines, OPPTS Number 850.2300: Avian Reproduction Test. Draft April 1996. Office of Prevention, Pesticides, and Toxic Substances.

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**Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on  
Mallard Duck (*Anas platyrhynchos*)**

PMRA Submission Number {.....}

EPA MRID Number 473723-46

42	Dose2	98.21	55	91.67	100.00	0.31	36	248	115	112	242
43	Dose2	25.00	8	23.53	100.00	0.33	38	241	100	45	303
44	Dose2	60.00	29	56.86	96.67	0.36	37	277	151	51	402
45	Dose2	87.50	28	68.29	100.00	0.34	38	260	105	-165	251
46	Dose3	75.00	33	71.74	100.00	0.34	37	250	108	43	332
47	Dose3	98.00	49	87.50	100.00	0.32	33	254	115	-151	111
48	Dose3	27.66	13	26.00	100.00	0.37	38	261	108	19	383
49	Dose3	84.09	37	82.22	100.00	0.31	35	255	90	19	337
50	Dose3	38.46	5	21.74	100.00	0.34	32	244	74	-68	173
51	Dose3	58.14	25	54.35	100.00	0.31	37	244	123	-117	220
52	Dose3	100.00	1	1.96	100.00	0.31	33	231	100	-57	106
53	Dose3	86.11	31	86.11	100.00	0.34	33	246	92	-45	160
54	Dose3	95.92	47	92.16	100.00	0.31	33	260	115	-99	312
55	Dose3	83.33	30	76.92	100.00	0.32	39	244	88	40	271
56	Dose3	62.22	28	62.22	100.00	0.34	35	230	93	-3	158
57	Dose3	96.15	50	80.65	100.00	0.33	34	254	120	27	275
58	Dose3	86.11	31	83.78	100.00	0.32	36	239	79	-88	271
59	Dose3	89.13	41	89.13	100.00	0.33	38	237	121	9	217
60	Dose3	76.32	29	65.91	100.00	0.34	39	236	100	-123	315

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46  
ANALYSIS RESULTS FOR VARIABLE EL (Eggs Laid)

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01  
Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05  
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.985	0.650	0.984	0.407	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	52.00	13.72	3.54	26.38	44.40, 59.60
Dose1	15	54.00	12.54	3.24	23.22	47.05, 60.95
Dose2	15	51.07	10.28	2.66	20.14	45.37, 56.76
Dose3	15	49.67	9.57	2.47	19.28	44.36, 54.97

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	54.00	28.00	73.00	.	.
Dose1	54.00	35.00	77.00	103.85	-3.85
Dose2	56.00	33.00	65.00	98.21	1.79
Dose3	50.00	28.00	67.00	95.51	4.49

\*\*\*\*\*

## PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.37	0.778

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	52.00	.	53.00	.	0.965	0.996	0.947	.	.
Dose1	54.00	0.887	53.00	0.680	.	0.901	0.739	.	.
Dose2	51.07	0.664	51.07	0.520	.	.	0.988	.	.
Dose3	49.67	0.521	49.67	0.387	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE NEG\_EC (Eggs Cracked)

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.627	<.001	6.084	0.001	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	0.07	0.26	0.07	387.30	0.00, 0.21
Dose1	15	0.07	0.26	0.07	387.30	0.00, 0.21
Dose2	15	0.33	0.62	0.16	185.16	0.00, 0.68
Dose3	15	0.13	0.35	0.09	263.90	0.00, 0.33

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	0.00	0.00	1.00	.	.
Dose1	0.00	0.00	1.00	100.00	0.00
Dose2	0.00	0.00	2.00	500.00	-400.00
Dose3	0.00	0.00	1.00	200.00	-100.00

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.59	0.309

MannWhit (Bon) - testing each trt median signif. greater than control

Jonckheere - test assumes dose-response relationship, testing positive trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	0.00	.	.
Dose1	0.00	1.000	0.500
Dose2	0.00	1.000	0.052
Dose3	0.00	1.000	0.156

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE ENC\_EL ( (EL-EC)/EL (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.618	<.001	4.805	0.005	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	99.82	0.68	0.18	0.68	99.45, 100.00
Dose1	15	99.87	0.51	0.13	0.51	99.59, 100.00
Dose2	15	99.36	1.15	0.30	1.16	98.73, 100.00
Dose3	15	99.73	0.71	0.18	0.71	99.34, 100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	97.37	100.00	.	.
Dose1	100.00	98.04	100.00	100.04	-0.04
Dose2	100.00	96.61	100.00	99.54	0.46
Dose3	100.00	97.78	100.00	99.91	0.09

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.51	0.320

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.519
Dose2	100.00	1.000	0.058
Dose3	100.00	1.000	0.177

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46  
ANALYSIS RESULTS FOR VARIABLE ES (Eggs Set)

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01  
Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05  
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.988	0.826	1.347	0.268	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	47.27	13.51	3.49	28.59	39.78, 54.75
Dose1	15	49.13	11.99	3.10	24.40	42.49, 55.77
Dose2	15	45.80	9.17	2.37	20.01	40.72, 50.88
Dose3	15	45.13	9.16	2.37	20.30	40.06, 50.21

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	48.00	24.00	68.00	.	.
Dose1	47.00	32.00	72.00	103.95	-3.95
Dose2	46.00	31.00	60.00	96.90	3.10
Dose3	46.00	23.00	62.00	95.49	4.51

\*\*\*\*\*

## PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.38	0.767

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	47.27	.	48.20	.	0.967	0.984	0.953	.	.
Dose1	49.13	0.885	48.20	0.678	.	0.844	0.758	.	.
Dose2	45.80	0.604	45.80	0.455	.	.	0.998	.	.
Dose3	45.13	0.531	45.13	0.397	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE ES\_EL ( EggsSet/EggsLaid (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.877	<.001	0.352	0.788	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	90.36	2.97	0.77	3.29	88.72, 92.01
Dose1	15	90.89	3.41	0.88	3.75	89.00, 92.77
Dose2	15	89.82	3.32	0.86	3.69	87.98, 91.66
Dose3	15	90.64	2.93	0.76	3.23	89.01, 92.26

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	90.91	83.72	93.22	.	.
Dose1	92.31	82.14	94.87	100.58	-0.58
Dose2	90.48	82.14	93.94	99.40	0.60
Dose3	91.07	82.14	94.87	100.30	-0.30

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.73	0.630

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	90.91	.	.
Dose1	92.31	1.000	0.733
Dose2	90.48	1.000	0.312
Dose3	91.07	1.000	0.317

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE VE ( Viable Embryo(d14) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.931	0.002	2.531	0.066	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	32.20	23.41	6.04	72.69	19.24, 45.16
Dose1	15	34.67	18.24	4.71	52.60	24.57, 44.77
Dose2	15	41.07	12.17	3.14	29.64	34.32, 47.81
Dose3	15	38.80	14.07	3.63	36.27	31.01, 46.59

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	33.00	0.00	66.00	.	.
Dose1	38.00	0.00	58.00	107.66	-7.66
Dose2	42.00	13.00	57.00	127.54	-27.54
Dose3	44.00	1.00	52.00	120.50	-20.50

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.54	0.672

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	33.00	.	.
Dose1	38.00	1.000	0.669
Dose2	42.00	1.000	0.863
Dose3	44.00	1.000	0.866

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE VE\_ES ( ViableEmbryo/EggsSet (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.772	<.001	5.228	0.003	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	68.26	42.63	11.01	62.45	44.65, 91.86
Dose1	15	71.89	35.12	9.07	48.85	52.44, 91.34
Dose2	15	88.83	16.78	4.33	18.89	79.54, 98.12
Dose3	15	85.92	25.64	6.62	29.84	71.72, 100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	91.30	0.00	100.00	.	.
Dose1	91.89	0.00	100.00	105.33	-5.33
Dose2	95.00	34.21	100.00	130.15	-30.15
Dose3	94.00	1.96	100.00	125.88	-25.88

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.53	0.317

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	91.30	.	.
Dose1	91.89	1.000	0.467
Dose2	95.00	1.000	0.911
Dose3	94.00	1.000	0.949

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE LE ( Live Embryo(d21) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.932	0.002	2.548	0.065	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	32.07	23.37	6.03	72.86	19.13, 45.01
Dose1	15	34.13	18.20	4.70	53.33	24.05, 44.21
Dose2	15	40.73	12.46	3.22	30.59	33.83, 47.63
Dose3	15	38.67	14.02	3.62	36.26	30.90, 46.43

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	33.00	0.00	66.00	.	.
Dose1	38.00	0.00	58.00	106.44	-6.44
Dose2	42.00	11.00	56.00	127.03	-27.03
Dose3	44.00	1.00	52.00	120.58	-20.58

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.68	0.641

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	33.00	.	.
Dose1	38.00	1.000	0.654
Dose2	42.00	1.000	0.874
Dose3	44.00	1.000	0.880

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE LE\_VE ( LiveEmbryo/ViableEmbryo (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.577	<.001	2.668	0.057	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	12	99.50	1.27	0.37	1.27	98.70, 100.00
Dose1	14	98.37	2.86	0.77	2.91	96.72, 100.00
Dose2	15	98.49	3.98	1.03	4.04	96.29, 100.00
Dose3	15	99.70	0.81	0.21	0.81	99.25, 100.00

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	95.83	100.00	.	.
Dose1	100.00	90.00	100.00	98.86	1.14
Dose2	100.00	84.62	100.00	98.98	1.02
Dose3	100.00	97.44	100.00	100.20	-0.20

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.00	0.392

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.118
Dose2	100.00	1.000	0.317
Dose3	100.00	1.000	0.731

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE NH (Number Hatched)

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.957	0.034	1.782	0.161	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	27.87	21.91	5.66	78.64	15.73, 40.00
Dose1	15	27.93	16.73	4.32	59.88	18.67, 37.20
Dose2	15	28.27	15.62	4.03	55.27	19.62, 36.92
Dose3	15	30.00	14.68	3.79	48.92	21.87, 38.13

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	30.00	0.00	63.00	.	.
Dose1	26.00	0.00	57.00	100.24	-0.24
Dose2	28.00	3.00	55.00	101.44	-1.44
Dose3	31.00	1.00	50.00	107.66	-7.66

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.05	0.985

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	27.87	.	28.52	.	1.000	1.000	0.987	.	.
Dose1	27.93	0.754	28.52	0.626	.	1.000	0.988	.	.
Dose2	28.27	0.772	28.52	0.661	.	.	0.993	.	.
Dose3	30.00	0.855	28.52	0.680	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE NH\_EL ( NumberHatched/EggsLaid (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.870	<.001	1.983	0.127	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	52.09	35.06	9.05	67.30	32.67, 71.50
Dose1	15	51.29	25.51	6.59	49.74	37.16, 65.42
Dose2	15	53.12	24.05	6.21	45.28	39.80, 66.44
Dose3	15	59.67	25.77	6.65	43.18	45.40, 73.94

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	71.64	0.00	87.50	.	.
Dose1	59.62	0.00	78.18	98.47	1.53
Dose2	60.87	6.82	84.62	101.98	-1.98
Dose3	66.67	1.79	83.93	114.56	-14.56

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.91	0.591

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	71.64	.	.
Dose1	59.62	0.787	0.253
Dose2	60.87	0.977	0.342
Dose3	66.67	0.977	0.735

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE NH\_ES ( NumberHatched/EggsSet (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.872	<.001	2.056	0.116	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	57.70	38.80	10.02	67.24	36.22, 79.19
Dose1	15	56.29	28.18	7.28	50.07	40.69, 71.90
Dose2	15	59.14	26.92	6.95	45.52	44.23, 74.04
Dose3	15	65.49	27.82	7.18	42.48	50.08, 80.90

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	77.42	0.00	94.03	.	.
Dose1	65.96	0.00	93.48	97.56	2.44
Dose2	68.29	7.89	91.67	102.48	-2.48
Dose3	76.92	1.96	92.16	113.50	-13.50

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.80	0.615

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	77.42	.	.
Dose1	65.96	0.655	0.209
Dose2	68.29	0.999	0.346
Dose3	76.92	1.000	0.687

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE NH<sub>LE</sub> ( NumberHatched/LiveEmbryo (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.894	<.001	0.885	0.455	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	12	82.13	19.37	5.59	23.58	69.82, 94.43
Dose1	14	83.37	17.57	4.70	21.08	73.23, 93.52
Dose2	15	67.73	27.21	7.03	40.18	52.66, 82.80
Dose3	15	77.11	21.71	5.60	28.15	65.09, 89.13

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	90.69	37.04	96.23	.	.
Dose1	90.88	48.28	100.00	101.52	-1.52
Dose2	71.43	8.11	98.21	82.47	17.53
Dose3	84.09	27.66	100.00	93.89	6.11

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	4.18	0.243

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	90.69	.	.
Dose1	90.88	1.000	0.748
Dose2	71.43	0.213	0.074
Dose3	84.09	0.869	0.156

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE HS ( Hatching Survival(d14) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.959	0.043	1.838	0.151	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	27.73	21.87	5.65	78.86	15.62, 39.85
Dose1	15	27.87	16.78	4.33	60.20	18.58, 37.16
Dose2	15	28.00	15.49	4.00	55.33	19.42, 36.58
Dose3	15	30.00	14.68	3.79	48.92	21.87, 38.13

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	30.00	0.00	63.00	.	.
Dose1	26.00	0.00	57.00	100.48	-0.48
Dose2	28.00	3.00	55.00	100.96	-0.96
Dose3	31.00	1.00	50.00	108.17	-8.17

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.06	0.982

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	27.73	.	28.40	.	1.000	1.000	0.984	.	.
Dose1	27.87	0.758	28.40	0.628	.	1.000	0.987	.	.
Dose2	28.00	0.765	28.40	0.663	.	.	0.989	.	.
Dose3	30.00	0.860	28.40	0.682	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE HS\_ES ( HatchingSurvival/EggsSet (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.874	<.001	1.977	0.128	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	57.37	38.61	9.97	67.30	35.99, 78.76
Dose1	15	56.17	28.32	7.31	50.43	40.48, 71.85
Dose2	15	58.55	26.72	6.90	45.64	43.75, 73.35
Dose3	15	65.49	27.82	7.18	42.48	50.08, 80.90

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	77.42	0.00	94.03	.	.
Dose1	68.09	0.00	93.48	97.90	2.10
Dose2	68.29	7.89	91.67	102.05	-2.05
Dose3	76.92	1.96	92.16	114.15	-14.15

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.70	0.637

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	77.42	.	.
Dose1	68.09	0.828	0.267
Dose2	68.29	1.000	0.389
Dose3	76.92	1.000	0.724

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE HS\_NH ( HatchingSurvival/NumberHatched (%) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.617	<.001	3.122	0.034	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	12	99.47	1.31	0.38	1.31	98.64, 100.00
Dose1	14	99.66	2.37	0.63	2.37	98.29, 100.00
Dose2	15	99.09	1.82	0.47	1.83	98.08, 100.00
Dose3	15	100.00	0.00	0.00	0.00	., .

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	100.00	95.83	100.00	.	.
Dose1	100.00	92.00	103.23	100.19	-0.19
Dose2	100.00	93.75	100.00	99.61	0.39
Dose3	100.00	100.00	100.00	100.53	-0.53

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	5.22	0.157

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.837
Dose2	100.00	1.000	0.244
Dose3	100.00	1.000	0.727

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46  
ANALYSIS RESULTS FOR VARIABLE THICK ( Eggshell thickness )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01  
Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05  
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks Test Stat	Shapiro-Wilks P-value	Levenes Test Stat	Levenes P-value	Conclusion
0.988	0.815	0.300	0.825	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	0.33	0.02	0.00	5.84	0.32, 0.34
Dose1	15	0.33	0.02	0.01	6.23	0.32, 0.34
Dose2	15	0.33	0.02	0.00	5.14	0.32, 0.34
Dose3	15	0.33	0.02	0.00	4.69	0.32, 0.34

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	0.33	0.29	0.37	.	.
Dose1	0.33	0.29	0.37	100.16	-0.16
Dose2	0.33	0.30	0.36	99.64	0.36
Dose3	0.33	0.31	0.37	98.99	1.01

\*\*\*\*\*

## PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

### Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.13	0.939

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	0.33	.	0.33	.	1.000	0.998	0.958	.	.
Dose1	0.33	0.778	0.33	0.600	.	0.994	0.937	.	.
Dose2	0.33	0.680	0.33	0.537	.	.	0.988	.	.
Dose3	0.33	0.541	0.33	0.407	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE HATWT ( Hatchling Weight )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.963	0.086	0.862	0.467	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	12	36.03	2.07	0.60	5.74	34.72, 37.35
Dose1	14	36.91	2.48	0.66	6.71	35.48, 38.34
Dose2	15	36.47	1.80	0.47	4.94	35.47, 37.47
Dose3	15	35.23	2.38	0.61	6.75	33.91, 36.54

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	36.30	32.30	38.10	.	.
Dose1	36.30	32.70	41.00	102.44	-2.44
Dose2	35.70	34.10	40.50	101.22	-1.22
Dose3	35.10	32.10	39.40	97.76	2.24

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	52	1.56	0.209

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	36.03	.	36.51	.	0.739	0.955	0.780	.	.
Dose1	36.91	0.962	36.51	0.792	.	0.949	0.178	.	.
Dose2	36.47	0.887	36.47	0.814	.	.	0.414	.	.
Dose3	35.23	0.336	35.23	0.230	.	.	.	.	.

  

SUMMARY	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE SURWWT ( Survivor Wt (d14) )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.980	0.468	1.067	0.371	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	12	254.74	10.84	3.13	4.26	247.85, 261.63
Dose1	14	257.93	15.44	4.13	5.99	249.01, 266.85
Dose2	15	254.03	13.93	3.60	5.49	246.31, 261.74
Dose3	15	245.61	9.87	2.55	4.02	240.14, 251.07

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	257.70	242.00	268.20	.	.
Dose1	255.75	233.60	283.40	101.25	-1.25
Dose2	251.90	230.80	276.60	99.72	0.28
Dose3	244.40	229.90	260.80	96.41	3.59

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	52	2.48	0.071

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	254.74	.	256.46	.	0.920	0.999	0.263	.	.
Dose1	257.93	0.910	256.46	0.721	.	0.844	0.057	.	.
Dose2	254.03	0.680	254.03	0.553	.	.	0.282	.	.
Dose3	245.61	0.083	245.61	0.044	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose2	Dose3

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE FOOD (Food Consumption)

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.892	<.001	1.397	0.253	USE NON-PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	103.60	18.00	4.65	17.37	93.63, 113.57
Dose1	15	104.93	13.89	3.59	13.24	97.24, 112.63
Dose2	15	102.53	31.64	8.17	30.86	85.01, 120.06
Dose3	15	101.73	15.53	4.01	15.27	93.13, 110.33

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	98.00	85.00	155.00	.	.
Dose1	108.00	76.00	134.00	101.29	-1.29
Dose2	105.00	11.00	151.00	98.97	1.03
Dose3	100.00	74.00	123.00	98.20	1.80

\*\*\*\*\*

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.99	0.803

MannWhit (Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit (Bon adjust)p-value	Jonckheere p-value
Ctrl	98.00	.	.
Dose1	108.00	1.000	0.869
Dose2	105.00	1.000	0.809
Dose3	100.00	1.000	0.612

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE WTGAINM ( Male wt gain )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.980	0.440	0.581	0.630	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	-17.47	90.17	23.28	-516.25	-67.40, 32.47
Dose1	15	-14.67	122.30	31.58	-833.87	-82.39, 53.06
Dose2	15	-29.60	91.58	23.65	-309.38	-80.31, 21.11
Dose3	15	-39.60	65.75	16.98	-166.04	-76.01, -3.19

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	0.00	-186.00	162.00	.	.
Dose1	-24.00	-248.00	284.00	83.97	16.03
Dose2	-31.00	-184.00	112.00	169.47	-69.47
Dose3	-45.00	-151.00	43.00	226.72	-126.72

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	0.22	0.881

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	-17.47	.	-16.07	.	1.000	0.985	0.918	.	.
Dose1	-14.67	0.778	-16.07	0.601	.	0.973	0.888	.	.
Dose2	-29.60	0.608	-29.60	0.460	.	.	0.991	.	.
Dose3	-39.60	0.479	-39.60	0.347	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose3	>highest dose

# Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on Mallard Duck (*Anas platyrhynchos*)

PMRA Submission Number {.....}

EPA MRID Number 473723-46

Mallard repro, Fluopyram, MRID 473723-46

ANALYSIS RESULTS FOR VARIABLE WTGAINF ( Female wt gain )

## TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance (absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.980	0.434	0.876	0.459	USE PARAMETRIC TESTS

\*\*\*\*\*

## BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf. Interval
Ctrl	15	239.00	85.39	22.05	35.73	191.71, 286.29
Dose1	15	251.73	70.22	18.13	27.89	212.85, 290.62
Dose2	15	293.73	68.95	17.80	23.47	255.55, 331.91
Dose3	15	242.73	86.73	22.39	35.73	194.70, 290.76

Level	Median	Min	Max	%of Control (means)	%Reduction (means)
Ctrl	252.00	94.00	394.00	.	.
Dose1	259.00	114.00	397.00	105.33	-5.33
Dose2	257.00	217.00	424.00	122.90	-22.90
Dose3	271.00	106.00	383.00	101.56	-1.56

\*\*\*\*\*

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	56	1.55	0.211

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Tukey p-values				
					Dose1	Dose2	Dose3	Dose4	Dose5
Ctrl	239.00	.	261.49	.	0.970	0.233	0.999	.	.
Dose1	251.73	0.882	261.49	0.859	.	0.462	0.989	.	.
Dose2	293.73	0.998	261.49	0.886	.	.	0.291	.	.
Dose3	242.73	0.795	242.73	0.692	.	.	.	.	.

SUMMARY

Dunnett	NOEC	LOEC
Williams	Dose3	>highest dose
	Dose3	>highest dose

**Data Summary and Review on the Reproductive Effects of AE C656948 (Fluopyram) on  
Mallard Duck (*Anas platyrhynchos*)**

PMRA Submission Number {.....}

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**Box Plot:**

